Arquitetura de Redes

Laboratory Guide

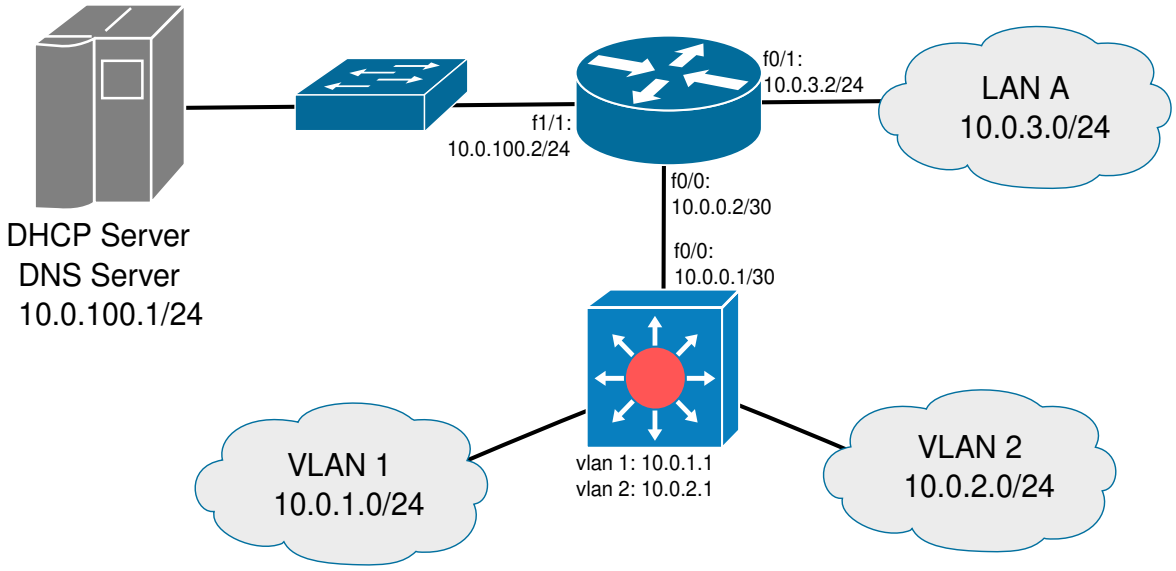
Objectives

- Deployment of a DHCP server
- Deployment of a DNS server

DHCP

1. Construct the network below, using as DHCP server a Debian server. Configure all static IPv4 addresses (Servers, Router and SWL3 interfaces) and deploy a routing mechanism. Test full connectivity between devices before proceeding.

Important: A wrongly (or forgotten) active DHCP server in a network can create severe connection issues to users. After this guide, disable or uninstall the DHCP server.



2. At the DHCP server, install package isc-dhcp-server: apt-get install isc-dhcp-server

Edit file /etc/default/isc-dhcp-server to define the interfaces where DHCP messages are received:

INTERFACES="**eth0**"

Edit file /etc/dhcp/dhcpd.conf to create IPv4 address pools to all (V)LAN:

```
option domain-name-servers 10.0.100.1;
subnet 10.0.1.0 netmask 255.255.255.0 {
  range 10.0.1.10 10.0.1.200;
  option routers 10.0.1.1;}
subnet 10.0.2.0 netmask 255.255.255.0 {
  range 10.0.2.10 10.0.2.200;
  option routers 10.0.2.1;}
subnet 10.0.3.0 netmask 255.255.255.0 {
  range 10.0.3.10 10.0.3.200;
  option routers 10.0.3.2;}
subnet 10.0.100.0 netmask 255.255.255.0 {
  range 10.0.100.10 10.0.100.200;
  option routers 10.0.100.2;}
```

(Re)Start the DHCP server: sudo service isc-dhcp-server restart

Check the file /var/log/syslog to inspect and solve possible errors.

3. At all L3 interfaces of Routers/SWL3 (with terminals) configure the DHCP relay agent to send DHCP requests to the central DHCP server:

```
Router(config)# service dhcp
Router(config)# interface vlan 1
Router(config-if)# ip helper-address 10.0.100.1
```

4. Activate DHCP in interfaces of all (V)LAN terminal devices. Check the obtained IPv4 addresses.

5. Repeat steps 1 to 4 for IPv6, using the configuration file dhcpd6.conf and the router relay agent command: ipv6 dhcp relay destination <ipv6_addr_DHCP>

DNS

6. At the DNS server, install package bind9: apt-get install bind9

Assuming that you own the domain **ar.com** configure your DNS server to act as a master server (zone) for that domain. Start by creating the definition of the zone with the associated *statements* (zone specific parameters), edit the file /etc/bind/named.conf.local (with root privileges) and add the following definition:

```
zone "ar.com" in{
  type master;                          //statement to define the zone as master
  file "/etc/bind/db.ar.com";                   //location of the zone file with the records
};
```

Create the file /etc/bind/db.ar.com (with root privileges) and add the following contents:

```
$TTL    604800
$ORIGIN ar.com.
@       IN      SOA     ns1.ar.com. adm.ar.com. (
                              2         ; Serial
                         604800         ; Refresh
                          86400         ; Retry
                        2419200         ; Expire
                         604800 )       ; Negative Cache TTL
        IN      NS      ns1.ar.com.
        IN      A       10.0.100.1
v1sw1   IN      A       10.0.1.1
v1sw1   IN      AAAA    2001:0:1::1
@       IN      MX      10      server1
ns1     IN      A       10.0.100.1
server1 IN      A       10.0.100.1
server2 IN      CNAME   server1
```

Verify if your zone file it is correctly defined:

```
named-checkzone ar.com db.ar.com
```

Restart your DNS server:

```
service bind9 restart
```

Using a Linux terminal, test the configuration of your DNS by performing the following DNS queries:

```
dig @10.0.100.1 ar.com
dig @10.0.100.1 v1sw1.ar.com
dig @10.0.100.1 v1sw1.ar.com AAAA
dig @10.0.100.1 server1.ar.com
dig @10.0.100.1 server2.ar.com
dig @10.0.100.1 ar.com MX
```

Analyze the output of the dig commands.

7. Add a zone to configure the IPv4 reverse DNS mapping of your domain. Add to /etc/bind/named.conf.local the following zone definition:

```
zone "1.0.10.in-addr.arpa" in{
 type master;
 file "/etc/bind/db.10.0.1.rev"; };
```

Create the file /etc/bind/db.10.0.1.rev (with root privileges) and add the following contents:

```
$TTL    604800
$ORIGIN 1.0.10.in-addr.arpa.
@       IN      SOA     ns1.ar.com. adm.ar.com. (
                              2         ; Serial
                         604800         ; Refresh
                          86400         ; Retry
                        2419200         ; Expire
                         604800 )       ; Negative Cache TTL
        IN    NS     ns1.ar.com.
1         IN    PTR    v1sw1.ar.com. ; qualified name
11        IN    PTR    vlan1-11.ar.com.
12        IN    PTR    vlan1-12.ar.com.
```

Restart your DNS server:

```
service bind9 restart
```

Using your PC, test your configuration with the commands:

```
host 10.0.1.1 10.0.100.1
```

```
host 10.0.1.2 10.0.100.1
host 10.0.1.11 10.0.100.1
host 10.0.1.12 10.0.100.1
```